JOINT POLAR SATELLITE SYSTEM (JPSS) COMMON GROUND SYSTEM (CGS)

IDPS PRO BINARY EDITOR TOOL USER'S MANUAL

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RAYTHEON COMPANY
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TITLE: JOINT POLAR SATELLITE SYSTEM (JPSS) COMMON GROUND SYSTEM (CGS) IDPS PRO BINARY EDITOR TOOL USER'S MANUAL

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Table of Contents

List of Figures

List of Tables

1   SCOPE

The Binary Editor allows users to export and import data into a binary file that is defined by PRO XML. The tool does not generate files from scratch, but instead updates an existing binary file. Users can import and export data as binary or ASCII text. Users may also edit individual fields in the binary file with a graphical user interface.

1.1   DOCUMENT OVERVIEW

This document provides information to understand the PRO Binary Editor functionality; specifically, how the tool works, inputs necessary to execute the tool, outputs that the tool generates, the Human Machine Interface (HMI), and tool limitations. The person using this tool is generally referred to as the User.

2   REFERENCE DOCUMENTS

This section identifies the documents referenced in this document.

TABLE 2-1 REFERENCED DOCUMENTS

Document Number	Title
UG60917-IDP-036	PRO XML Editor Users Manual
LI60917-GND-005	JPSS CGS Acronyms & Glossary
UG60917-IDP-034	IDPS ADL User Manual Part 1

3 OVERVIEW

The PRO Binary Editor operations are governed by the PRO Binary Editor operator's actions. The operator invokes the PRO Binary Editor, which results in the tool's HMI being displayed.

The PRO Binary Editor's HMI allows users to export, import, and edit individual fields within a PRO binary large object (BLOB) using the appropriate PRO XML as input.

Note that the PRO Binary Editor cannot edit a PRO BLOB which is variably sized or dynamically structured unless the PRO XML associated with it is edited to accurately describe the specific instance of the BLOB being edited, structuring the XML as if the product were static instead of variable. See Section 6.2 for more information

3.1 SUPPORTED PLATFORMS

The PRO Binary Editor is currently supported on IBM computers running the IBM AIX operating system and on platforms running Red Hat Enterprise Linux 5 for the Algorithm Development Library (ADL). The resource requirements, in terms of memory, storage, computing cycles, etc, are currently unavailable.

4   ENVIRONMENT SETUP

4.1   PREPARATION

The PRO Binary Editor requires the following software packages: Java 1.6 64, Apache Ant, and Apache log4j. The environment variable JAVA_HOME must point to the Java 1.6 64-bit install directory and $JAVA_HOME/bin must be in your PATH variable. Table 4-1 shows the needed environment variables that must be defined to compile and run the editor.

TABLE 4-1 COMPILE-TIME ENVIRONMENT VARIABLES

Variable Name	Value
HOME	User home directory path
JAVA_HOME	Path to Java 1.6 64-bit version
ANT_HOME	Path to the Apache Ant build utility's home directory
LOG4J_JAR_FILE	Path to log4j JAR file
XML_EDITOR_BASEDIR	The base directory of the XML editor's source and configuration files. This variable is necessary for disambiguating the directory structures of the IDPS processing and ADL development environments.
PRO_XML_SCHEMA	Path to the PRO XML schema; correct setting of this variable depends on the correct setting of the XML_EDITOR_BASEDIR variable
DFCB_XML_SCHEMA	Path to the CDFCB XML schema; correct setting of this variable depends on the correct setting of the XML_EDITOR_BASEDIR variable
PATH	User's PATH variable must contain $JAVA_HOME/bin so that the ant process is able to execute the xjc schema compiler.

4.2   RUNTIME ENVIRONMENT VARIABLES

The run time environment also depends on the correct setting of the environment variables listed in Table 4-1.

4.3   COMPILING THE BINARY EDITOR

To compile the Binary Editor, the environment variables in Table 4-1 must be set properly. Then go to <INSTALL_DIR>/java and execute "ant". This will compile the tool with the output JAR files in a subdirectory called dist. Other build targets include "javadocs" (to build the javadoc) and "clean", to remove all compiled byte code, the JAR files, javadocs, log file (created after running the tool), and directories created by the original ant build.

If you have followed the build instructions in ADL User's Manual Part 1, then the binary editor is already built.

4.4   RUNNING THE BINARY EDITOR

To run the Binary Editor, execute one of the following scripts:

- For ADL users: ${ADL_HOME}/script/bined
- For development users: ${PRO_HOME}/script/bined
- For ADA users: ${DPE_ROOT_PATH}/cat3/script/runAdaBinaryEditor.csh

5 USING THE BINARY EDITOR

The following sections will only explain how the import, export, and edit features of this tool work. If you need further direction on how the XML format works, see the UG60917-IDP-036 PRO XML Editor Users Manual.

The tool also provides basic metric information about a given binary and can provide basic IPAC analysis when compared to another binary in the same format.

The binary file(s) being used must be of the same endian-type as the platform the tool is being run on; the tool does not byte-swap data. For example, if you are running on a little-endian platform and want to use a binary that was created on a big-endian platform, that binary must first be byte-swapped. One option is to use the ADL data product endian conversion tool (AdlFileEndianConverter.exe), which is utility tool provided in the ADL.

5.1 OPEN DIALOG

The Open dialog under the File menu item requires users to select both the binary and XML format file. The files are then compared to verify that the binary file and the XML definition file agree on the size of the data. If they do not agree the status button will be red, and the files will not open
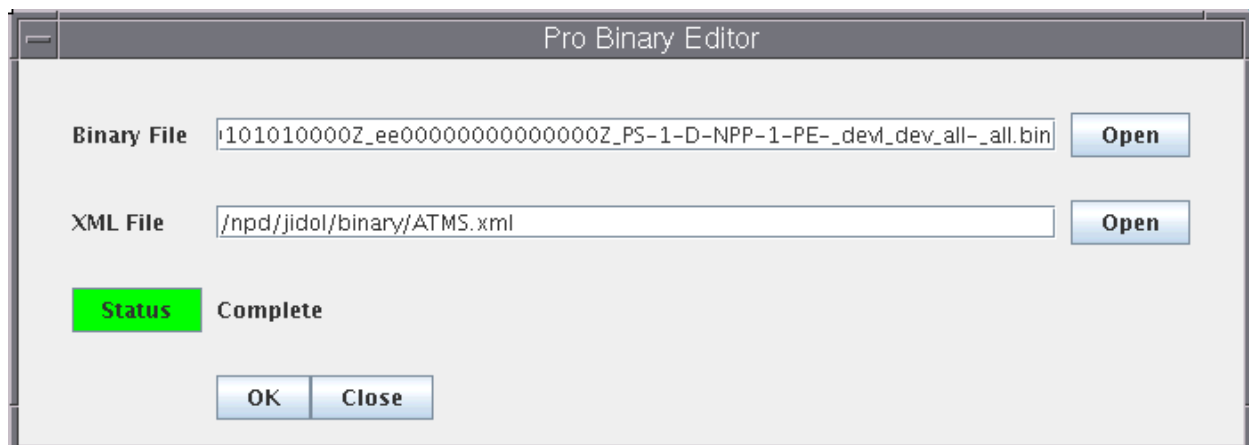

FIGURE 5.1-1 OPEN DIALOG

5.2 ACTIONS

Each field in the binary file (as described by the XML) can be exported, but only one at a time. The Import/Export/Edit options will be displayed by selecting a field and right clicking. The metric check must be done on the full product by clicking the top-level item and selecting metrics. Compare can be done on all fields by clicking the top-level item or on a given field by selecting the singular field.
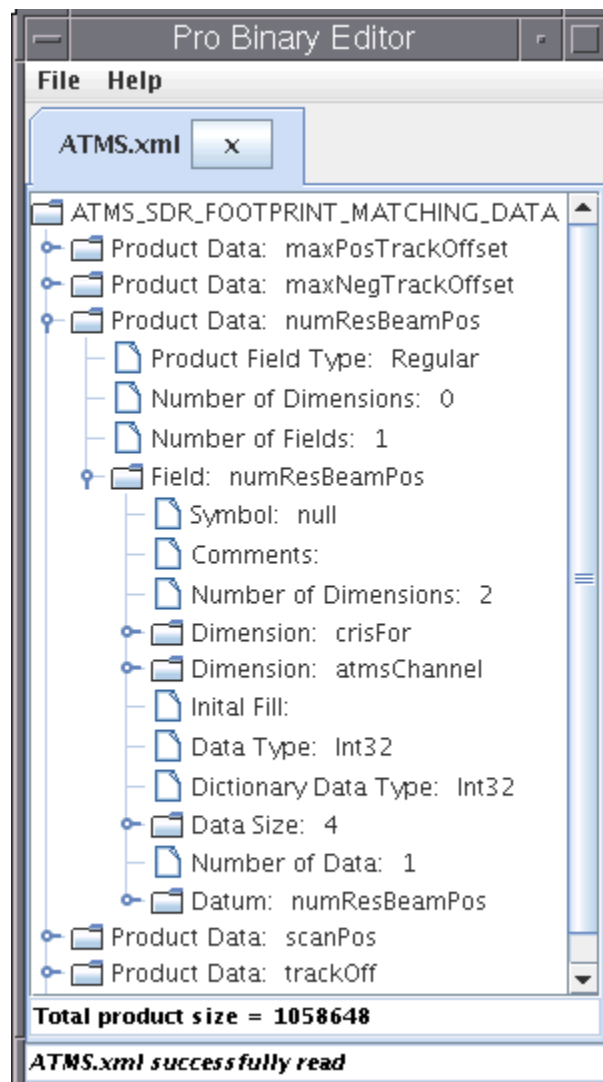
FIGURE 5.2-1 BINARY EDITOR XML VIEW

5.3   IMPORT

The Import option will replace the data in the selected field with data from a file. The file can be space delimited ASCII text or binary files. The data must be the exact size of the field being replaced.
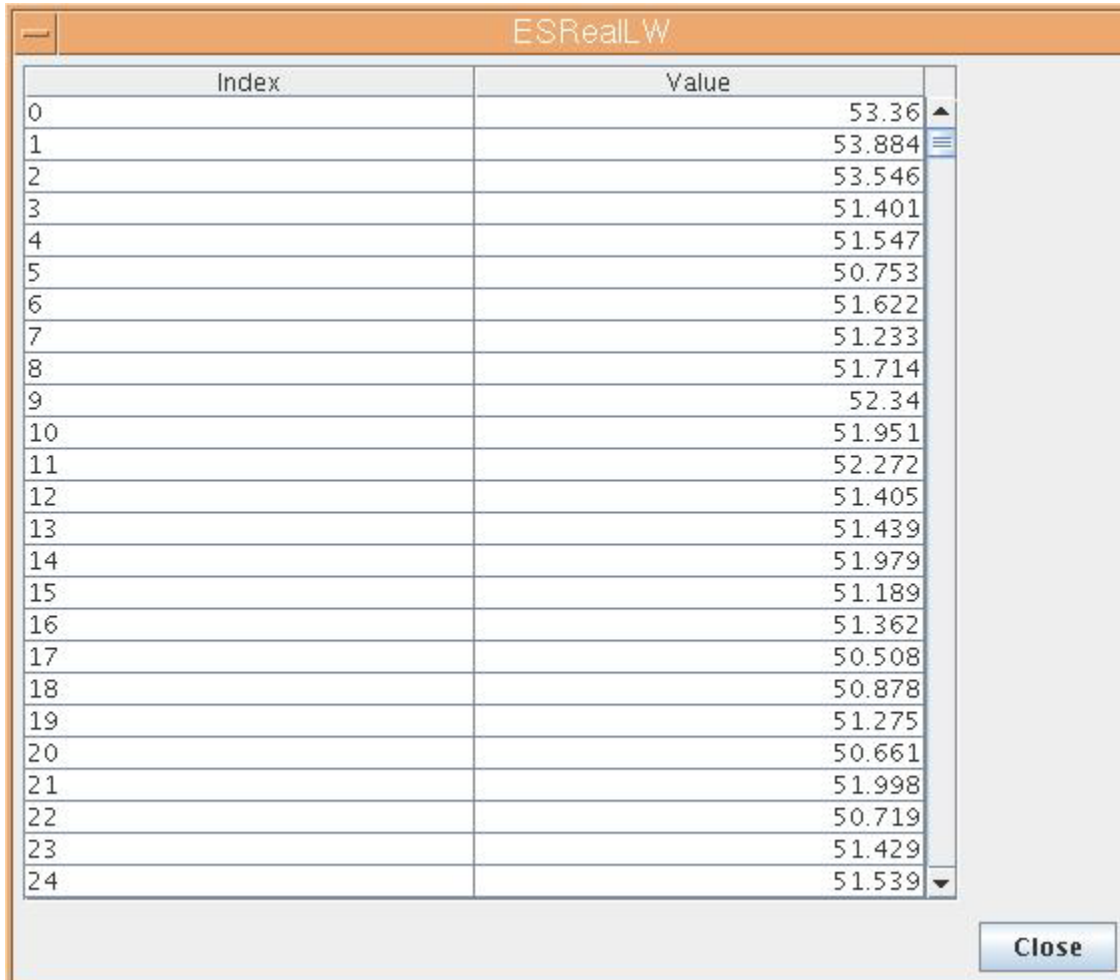
Once the import button is pressed, a file dialog will open allowing the user to select the file to import into the binary.

5.3.1   Export

The Export option will export the field from the binary that you have selected. If you give the file a ".txt" extension, the output will be in ASCII. All other extensions will result in a binary file being exported.

5.3.2 Edit

The Edit option allows the user to do an inline edit of an individual field within a graphical user interface. A dialog window will pop up with the field's contents, where the contents are editable (see Figure 5.3-1). When the user closes the dialog ("Close" button), an option to either save the data ("Yes" button), not save the data ("No" button), or cancel closing the dialog ("Cancel" button) will be displayed (see Figure 5.3-2).

ESRealLW	
Index	Value
0	53.36
1	53.884
2	53.546
3	51.401
4	51.547
5	50.753
6	51.622
7	51.233
8	51.714
9	52.34
10	51.951
11	52.272
12	51.405
13	51.439
14	51.979
15	51.189
16	51.362
17	50.508
18	50.878
19	51.275
20	50.661
21	51.998
22	50.719
23	51.429
24	51.539

FIGURE 5.3-1 BINARY EDITOR EDIT FIELD DIALOG

FIGURE 5.3-2 BINARY EDITOR CLOSE EDIT FIELD DIALOG

5.4   COMPARE

The compare logic provides a quick analysis of the binary fields against another binary of the same format.

The output of the compare will be binary images of the same size and type of the compared field. The compare produces both a relative compare and an absolute compare. The image outputs are also generated for each binary flag field on a flag basis for ease of analysis. The binary images are output in the name convention of Abs_<FieldName>.bin for the absolute compare and Rel_<FieldName>.bin for the relative difference compare.

An IPAC analysis is also done giving the three sigma results for each field compared.

The three sigmas used are 68.3, 95.5, and 99.7.

When selecting the compare utility you are prompted for the file to compare with, and the output directory for the binary images as shown in Figure 5.4-1.
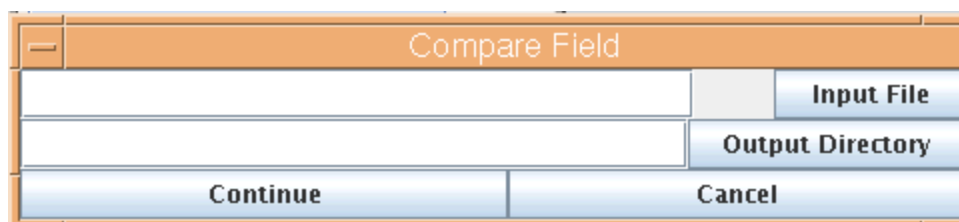

FIGURE 5.4-1 BINARY EDITOR COMPARE FIELD NAME DIALOG

After selecting the two values and pressing Continue, you are then prompted for the tolerance to use on each field. The default is 0.000001. The dialog for entering the tolerance for field compare is shown in Figure 5.4-2.

FIGURE 5.4-2 BINARY EDITOR TOLERANCE DIALOG

5.5 METRIC

The metric function takes the XML and compares all the data in the field against the range as defined in the XML. In addition it will give a histogram of the fields and information on the FILL values and counts in the data.

Once the metric selection is made, a file save dialog opens for the user to select the name of the output file. "Metric.txt" is the default name.

The metric output will be in the following format:

```
------------------------------------
Field:   <Field name as defined in the XML>
Histogram of <Datum name>
Number of Buckets <# of Buckets for the histogram>
Total number of elements:     <# of elements in the histogram>
Bucket:     <Bucket Value>    Count:       <Count for the Bucket>
----------
Range check Results:  <Field name as defined in the XML>
Maximum Range:  <Max range for the field >
Minimum Range:  <Minimum range for the field>
Number exceeding Max Range:  <# of elements exceeding the max range>
Number exceeding Min Range:  <# of elements smaller than the min range>
Number exceeding Max Range percentage:  <Percentage exceeding max range>
Number exceeding min Range percentage:  <Percentage exceeding min range>
Number within range:  <# in range>
Percentage within range:  <Percent in range>
Fill count = <Total number of fill values detected>
Fill percentage = <Percentage of fill>

<Histogram of values exceeding Minimum range>
<Histogram of the values exceeding Maximum range>
-----------------------------------------------
```

6   NOTES

6.1   ACRONYMS AND ABBREVIATIONS

Refer to document LI60917-GND-005 (JPSS CGS Acronyms & Glossary).

6.2   EDITING DYNAMIC BINARY OBJECTS

A few IDPS products are dynamic in size or structure. This means that rather than having fixed-sized data structures organized statically, with a static XML which describes the internal components in detail, these products may have variably-sized components in a changeable arrangement. Because the Binary Editor requires the Product XML to accurately describe all internal data structures of a Product in a static fashion, Binary Editor will not be able to access all the data elements of a dynamic binary product unless the Product XML is edited to accurately describe the data organization of the specific instance of the binary product being edited. Please refer to UG60917-IDP-036 (PRO XML Editor Users Manual) for guidance on editing the Product XML.

The following baseline IDPS data products are considered Dynamic Binary Objects for the purposes of editing with the PRO Binary Editor:

TABLE 6-1 DYNAMIC IDPS BINARY PRODUCTS

Product or Product Type	Associated XML
Indirectly-Indexed Gridded IP Tile Products	GRIDIP_VIIRS_ANN_MAX_MIN_NDVI_QUARTERLY_TILE.xml GRIDIP_VIIRS_BRDF_ARCH_17DAY_TILE.xml GRIDIP_VIIRS_DAILY_SURF_REFL_DAILY_TILE.xml GRIDIP_VIIRS_DAILY_SURF_REFL_TEMPLATE_DAILY_TILE.xml GRIDIP_VIIRS_LAND_SURF_ALBEDO_17DAY_TILE.xml GRIDIP_VIIRS_MTH_SR_BT_VI_MONTHLY_FINAL_TILE.xml GRIDIP_VIIRS_MTH_SR_BT_VI_MONTHLY_TILE.xml GRIDIP_VIIRS_MTH_SR_BT_VI_TEMPLATE_MONTHLY_TILE.xml GRIDIP_VIIRS_NBAR_NDVI_17DAY_TILE.xml GRIDIP_VIIRS_NBAR_NDVI_MONTHLY_TILE.xml GRIDIP_VIIRS_NBAR_NDVI_ROLLING_TILE.xml
VIIRS Solar Diffuser History Auxiliary Product	VIIRS_SOLAR_DIFF_AGG_HISTORY_AUX.xml
VIIRS Active Fires ARP	VIIRS_AF_EDR.xml

Product or Product Type	Associated XML
CrIS/CrIMSS Variable-Retrieval Products	CRIMSS_CRIS_AVMP_LOS_IR_IP.xml
	CRIMSS_CRIS_AVMP_LOS_MW_IP.xml
	CRIMSS_CRIS_AVTP_LOS_IR_IP.xml
	CRIMSS_CRIS_AVTP_LOS_MW_IP.xml
	CRIMSS_CRIS_CLOUD_CLEARED_RAD_IP.xml
	CRIMSS_CRIS_IR_SURF_EMISSIVITY_IP.xml
	CRIMSS_CRIS_MW_SURF_EMISSIVITY_IP.xml
	CRIMSS_CRIS_SKIN_TEMP_IP.xml
	CRIMSS_EDR.xml
	CRIS_IR_OZ_PROF_IP.xml